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FISHERIES MANAGEMENT REPORT
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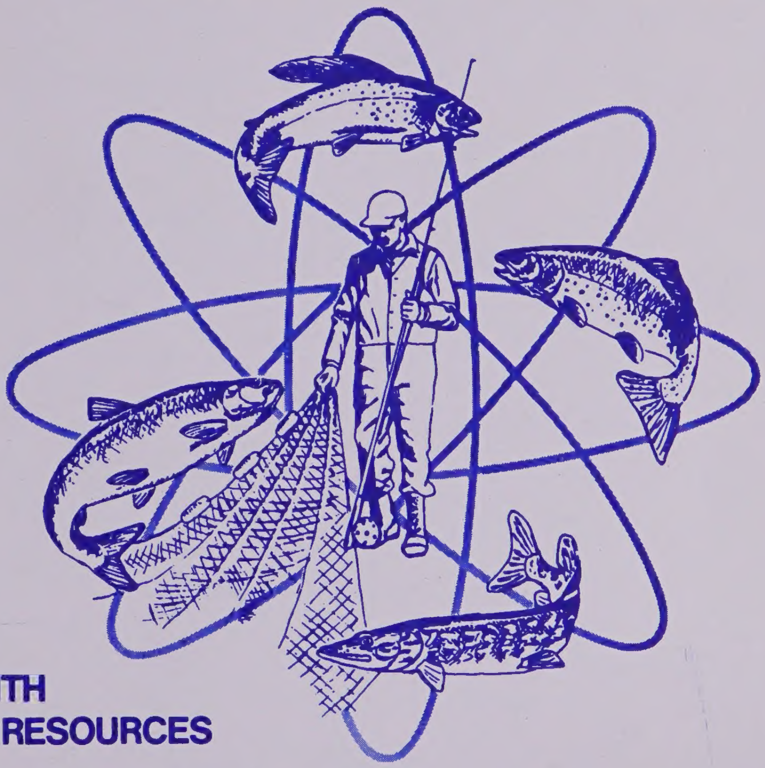

**INTEGRATING
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CHLORINATED ORGANIC INSECTICIDES IN FISH

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CHLORINATED ORGANIC INSECTICIDES IN FISH

by

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Report Submitted 1967

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INTRODUCTION

In view of a suggestion that the La Biche River (70-18-W4) be treated with chlorinated organic insecticides for blackfly control in the County of Athabasca, a study of the fish populations in this river system was initiated by Bidgood (MS 1966). During this study, samples of fish were collected and examined for concentrations of chlorinated organic insecticides. At the annual meeting of the Wildlife, Predator and Conservation Subcommittee held in Edmonton on March 15, 1967, it was suggested that additional samples of fish be gathered for analysis from the same area in 1967. The results of these analyses are summarized in this report and compared with the results from the 1966 samples of the same species of fish.

METHODS

On June 13, 1967, 50 yards of 4-inch mesh gill nets (stretched measure) were set at the mouth of the La Biche River. A sample of five yellow walleyes, Stizostedion vitreum vitreum (Mitchill), five mountain whitefish, Prosopium williamsoni (Girard), five white suckers, Catostomus commersoni (Lacepede), three northern redhorse suckers, Moxostoma macrolepidotum (Le Sueur), one goldeye, Hiodon alosoides (Rafinesque) and one burbot, Lota lota (Linnaeus) were submitted to the Provincial Dairy Laboratory on June 29, 1967 and analyzed for all chlorinated organic insecticides. Both the liver and muscle tissue were examined in most of

the samples. The concentration of insecticides was recorded separately for each fish.

RESULTS AND DISCUSSION

The results of the analysis of the 1967 samples are summarized in Table I. The insecticides, D.D.T., D.D.D., and D.D.E. were found in the muscle tissue of only two northern redhorse suckers of the total sample of twenty-three fish. All of the five yellow walleyes examined had D.D.T. and its derivatives in the liver tissue. Generally the concentration of organic insecticides is higher in the liver tissue than in the muscle tissue. However, the total concentration of D.D.T. and its derivations in the liver tissue of each fish was below the concentration specified by the Food and Drug as unfit for human consumption (1 p.p.m.). Dieldrin was absent from both the liver and muscle tissue of all the samples.

A comparison of the concentration of chlorinated organic insecticides found in the 1966 samples with those of the 1967 samples is presented in Table II for four species of fish. The occurrence of chlorinated organic insecticides was lower in the 1967 samples than in the 1966 samples. However, the concentration of D.D.T. and its derivatives in the liver tissue of the 1967 samples approached that of the 1966 samples.

The comparison of the results of samples gathered in two successive years indicates that larger samples of each species are required. Presuming that the concentration of insecticides accumulates in individual fish with age, a sample should comprise at least 30 fish of each age class of each species. However, these fish and especially yellow walleyes, are not permanent residents of any given area of this river system. Bidgood (MS 1966) found that a yellow walleye tagged at the mouth of the La Biche

River was captured 210 miles from the tagging location in 42 days. Other tag recoveries were from the La Biche River and both upstream and downstream in the Athabasca River system. It is suspected, although not validated, that other species migrate extensively throughout this river system. This random movement of the fish would influence the results from larger samples since individual fish would be subjected to various concentrations of chlorinated organic insecticides in localized areas.

ACKNOWLEDGEMENTS

The assistance of Conservation Officer E. C. Larson in collecting the samples is appreciated. The analyses were performed under the direction of Dr. V.W. Kadis, Director of the Provincial Dairy Laboratory in Edmonton, Alberta.

LITERATURE CITED

Bidgood, B. F. MS 1966. La Biche River. Alberta Department of Lands and Forests, Fish and Wildlife Division, Edmonton. 8 pp

TABLE I. Concentrations of chlorinated organic insecticides in fish collected at the confluence of the La Biche River with the Athabasca River on June 13, 1967. Concentrations of D.D.T. below 0.003 p.p.m. and D.D.E. and D.D.D. below 0.002 p.p.m. are recorded as a trace

Species	Sample No.	Concentration (p.p.m.)					
		Liver Tissue			Muscle Tissue		
		D.D.T.	D.D.D.	D.D.E.	D.D.T.	D.D.D.	D.D.E.
Yellow walleye	1	0.047	0.050	0.028	0	0	0
	2	0.066	0.010	0.030	0	0	0
	3	0.137	0.010	0.037	0	0	0
	4	0.074	0.027	0.031	0	0	0
	5	0.074	0.060	0.026	0	0	0
Mountain whitefish	1	0	0	0	0	0	0
	2	0	0	0	0	0	0
	3	0	0	0	0	0	0
	4	0	0	0	0	0	0
	5	0	0	0	0	0	0
Goldeye	1	0	0	trace	0	0	0
Burbot	1	0	0	0	0	0	0
White sucker	1	-	-	-	0	0	0
	2	-	-	-	0	0	0
	3	-	-	-	0	0	0
	4	-	-	-	0	0	0
	5	-	-	-	0	0.026	0
Redhorse sucker	1	-	-	-	0.120	0.012	0.006
	2	-	-	-	trace	trace	0.025
	3	-	-	-	0	0	0

TABLE II. Comparison of the concentration of chlorinated organic insecticides in fish captured in 1966 with those captured in 1967 at the confluence of the La Biche River with the Athabasca River. A concentration of less than 0.002 p.p.m. Dieldrin is recorded as a trace

Species	Year	Sample Size	Average Concentration (p.p.m.)						
			Liver Tissue				Muscle Tissue		
			D.D.T.	D.D.D.	D.D.E.	Dieldrin	D.D.T.	D.D.D.	D.D.E.
Y. walleye	1966	2	0.082	0.022	0.011	trace	0.065	0.016	0.002
	1967	5	0.080	0.031	0.030	0	0	0	0
M. whitefish	1966	1	0.022	0.006	trace	0	0.026	0.008	0.002
	1967	5	0	0	0	0	0	0	0
W. sucker	1966	2	0.055	0	0	0	0.011	0.003	trace
	1967	5	0	0	0.026	0	0	0	0
Goldeye	1966	1	0	0	0	0	0	0	trace
	1967	1	0	0	trace	0	0	0	0